Epitomes

Important Advances in Clinical Medicine

Plastic Surgery

The Scientific Board of the California Medical Association presents the following inventory of items of progress in plastic surgery. Each item, in the judgment of a panel of knowledgeable physicians, has recently become reasonably firmly established, both as to scientific fact and important clinical significance. The items are presented in simple epitome and an authoritative reference, both to the item itself and to the subject as a whole, is generally given for those who may be unfamiliar with a particular item. The purpose is to assist busy practitioners, students, research workers or scholars to stay abreast of these items of progress in plastic surgery that have recently achieved a substantial degree of authoritative acceptance, whether in their own field of special interest or another.

The items of progress listed below were selected by the Advisory Panel to the Section on Plastic Surgery of the California Medical Association and the summaries were prepared under its direction.

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Craniofacial Surgery for Fractures

ONE of the major spin-offs of craniofacial surgery has been the development of new approaches for treating major fractures of the craniofacial skeleton. The use of these techniques has resulted in shorter hospital stays, a more stable reconstruction, fewer secondary steps in the final reconstruction and, perhaps most important, a much improved aesthetic result.

The primary approach is through a complete dissection of the involved areas, primarily through a bicoronial incision as in congenital craniofacial problems but using lacerations for access as well. Radiographic evaluation is of course helpful to define the areas but a complete computed tomographic scan will offer the most help in deciding where the fractures are located. It is especially important that the major facial supporting areas (orbital, nasofrontal, zygomatic and pterygomaxillary buttresses) be adequately exposed, including the mandible when necessary. All of the bones thus exposed are then in a position to be carefully wired together in their proper position.

Areas of severe bone comminution or avulsion are bone grafted in the primary stage using split skull, split rib and iliac crest grafts as necessary. As a result of the meticulous repair of the fractures and using the strong supporting bone grafts contoured to obtain a normal anatomy, a stable craniofacial skeleton can be recreated that will rarely require extraskeletal fixation. In selected cases, mini-bone plates can be very helpful for the lower face and mandible, but they should be avoided as much as possible in areas of thin subcutaneous tissue such as the lateral orbital rims. Intermaxillary fixation can often be avoided by using the techniques described. The soft-tissue support thus obtained is one of the major factors for the improved results in these cases. All of the techniques known in congenital craniofacial operations must be used as necessary to reconstruct these areas of major acute injury. The lacrimal system has required additional operations for obstruction in only 17% of patients with injury to the area.

Complications have been amazingly few considering the degree of injury being treated by such techniques. Infection of soft and hard tissues has been the primary problem but sequestrums have only occurred in a small percentage in the two series reported. All of the medical specialties involved with the head would participate in the care for these complex injuries.

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Facial Palsy

FACIAL NERVE PARALYSIS remains a difficult challenge for plastic and reconstructive surgeons. Vast strides in this field have been made in the past ten years due in no small part to the sophistication of microneurovascular techniques. Even patients with long-standing unilateral palsy may be able to regain symmetry in repose and in voluntary facial responses.

The myriad of techniques that have been advocated to deal with facial palsy attests to the fact that none have given perfect results. Following nerve transection, immediate or early direct repair or cable grafting provides the best results. If reinnervation from the proximal ipsilateral seventh nerve is not possible, another peripheral nerve must be provided. This, however, must be done within six to nine months of the injury to assure reinnervation by one year. After that time the muscles will have poor, if any, motion. The hypoglossal, spinal accessory and phrenic nerves have all been used, but most surgeons feel that the donor deficit produced is too great, the resultant facial movements gross, reeducated voluntary con-

trol is poor and the lack of emotional response makes these techniques less than ideal.

Microneurovascular surgery has spawned the most promising procedures. Cross-face microneural grafting to bring voluntary and involuntary input from the contralateral facial nerve can reanimate existing facial muscles if done within the first six months, or can be used to innervate free vascularized muscle transfers.

A two-stage procedure using a cross-facial-sural nerve graft from the normal to the abnormal side, followed in six to eight months by a free microneurovascular transfer of an appropriate muscle to the previously placed nerve graft and local vessels, has a high success rate—80% to 90%. Some reports have shown that almost half the patients regain some degree of independent control of the reanimated side. The ideal choice for motor unit is not resolved, but the gracilis (whole or in part) or the pectoralis minor produced the best results.

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Plastic Surgery for Nonwhites

THE DESIRE for aesthetic facial surgical procedures by nonwhite patients is increasing. Factors influencing this increase range from wishing to look less like a perceived ethnic prototype to the desire to resemble a star from the entertainment world.

By and large, Asian patients seek alteration of their eyelids and nose. Those of African and Malaysian background more often request a smaller nasal configuration.

The change in appearance from the hooded upper eyelid to a well-defined fold is often striking. Additionally, female patients report that applying eyelid makeup is easier. Methods vary but generally include surgical fixation of loose dermis to the underlying levator apparatus, establishing a new eyelid fold 6 to 9 mm superior to the eyelash margins.

Changes in nasal appearance usually involve elevating the nasal dorsum (profile), narrowing the alar bases (frontal) and providing a thinner, more defined nasal tip. Various alloplastic materials are currently in vogue for dorsal elevation, but these carry the risks of extrusion and displacement. Autogenous cartilage and bone grafts are more difficult to use but are more stable.

The methods used in nasal operations are not new, but are based on proven maneuvers—fitting the operation to the patient. As in all surgical procedures, careful patient selection, discussion of realistic expectations and skillful preoperative planning are essential.

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Keloid and Hypertrophic Scar

PENETRATING WOUNDS of the skin elicit a cascade of biologic and biochemical events including inflammation and a fibroproliferative response that results in the deposition of collagen, noncollagenous proteins and proteoglycans. Scar tissue is the end product. The quality of a scar is directly related to the efficiency of the regulation of collagen production during wound healing and, specifically, the balance between new collagen synthesis and collagen degradation during the later stages of the process. Under certain circumstances, the equilibrium between collagen anabolism and catabolism is imbalanced, resulting in overproduction of collagen. In the extreme, hypertrophic scar or keloid may result.

The biologic differences between hypertrophic scar and keloid have yet to be completely characterized. Traditionally, hypertrophic scar has been classified as exuberant scar production within the boundaries of the original wound. A scar that overgrows and spreads beyond the borders of the original wound is called a keloid.

Biochemical and morphologic studies of the fibrillar collagen ultrastructure, the nature of chemical cross-linking of collagen molecules and the cell types inhabiting keloid and hypertrophic scar were conducted by Knapp and co-workers. They found that collagen fibers and fiber bundles showed an inverse correlation between degree of organization and scar abnormality. In addition, the collagen in skin and mature scars was highly cross-linked while that of hypertrophic scar and keloid was progressively less so. Three types of fibroblast seemed to populate the scars, with their relative distribution varying among the scar types. They concluded that hypertrophic scar and keloid are not distinct pathologic processes but, instead, represent progressively more aberrant activity in the continuum of the wound healing response.

Other evidence suggests that keloid fibroblasts produce significantly more collagen per cell than do fibroblasts derived from normal skin and normal scar. It may be that keloid fibroblasts have lost the ability to respond to feedback inhibitory signals that normally regulate wound healing.

Among other elements in the production of hypertrophic scar and keloid, variation encountered in the microvascular regeneration of the wound bed with low oxygen and high carbon dioxide levels has been implicated as a factor in promoting excessive collagen deposition and scar. Others have shown that the extracellular matrix of the wound exerts a powerful effect on the biosynthetic activity of cells; a hypertrophic scar or keloid could develop as a result of abnormal turnover of the wound matrix during the healing process.

The traditional treatment of hypertrophic scar and keloid has involved five general approaches: surgical procedures, pressure, irradiation, corticosteroids and other drugs. Currently, intralesional injection of triamcinolone acetonide alone or in combination with surgical correction appears to be the most popular means of dealing with these scars. The precise mechanism by which corticosteroids influence an abnormal scar is not known. It may be that the steroids influence collagen synthesis in scars by enhancing catabolic aspects of